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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/562,994

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Claus-Rupert Hohenthanner

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EXAMINER

YANCHUK, STEPHEN J

ART UNIT

PAPER NUMBER

4131

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/562,994	<b>Applicant(s)</b> HOENTHANNER ET AL.	
	<b>Examiner</b> STEPHEN YANCHUK	<b>Art Unit</b> 4131	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 May 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>05/09/2007, 05/09/2007</u> .                                  | 6) <input type="checkbox"/> Other: _____                          |

**PROCESS FOR MANUFACTURING A CATALYST-COATED POLYMER  
ELECTROLYTE MEMBRANE**

Examiner: S. Yanchuk      SN: 10/562994      Art: 4131      November 17, 2008

**DETAILED ACTION**

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 19 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

2. Claim 19 provides for the use of catalyst-coated PEM, but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

***Claim Rejections - 35 USC § 101***

3. 35 U.S.C. 101 reads as follows:

*Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.*

Claim 19 is rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper

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definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd. v. Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3, 5-15, and 18-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Kohler et al (PGPUB 2002/0064593).

Claims 1, 3, 11, 12, and 18 are rejected by Kohler teaching the process steps of having an unsupported polymer electrolyte membrane (PEM) supported on one surface by a backing film (support foil) (Instant claim 12) [Paragraph 20]. The first, non-backing side, is layered with a composite of first catalyst layer and the first water repellent gas distribution layer (GDL) [Paragraph 20]. The backing is then removed [Paragraph 23]. The side where the backing is removed is processed to have a composite of a second catalyst and gas distribution layer [Paragraph 24]. The first GDL acts as the backing (support foil) while the opposite layer is being processed [Paragraph 20], which shows that a support backing is present at all steps of fabrication. It is taught that inks which contain organic solvents are advantageous to use to apply the catalyst layer for all

process steps [Paragraph 28]. The PEM with layer on each side (3-layer catalyst-coated polymer) is dried after fabrication [Paragraph 29].

Claims 2 and 20 are rejected by figure 3 which shows an apparatus for continuous fabrication of the 3-layered PEM. It is also taught that the laminate of membrane, catalyst layers, and GDL are strip-shaped (tape form) [Paragraph 62].

Claims 4 and 14 are rejected by the teaching of a sealing of the peripheral edge zone of the MEA, between the MEA and the backing (foil) layer (R) [Paragraph 63]. This sealing is done by the impregnation with a polymer or adhesive [Paragraph 63].

Claims 6 and 7 are rejected by the teaching of MEAs being made of polyetherketones or polybenzimidazoles of thickness 10-200um [Paragraph 3].

Claims 8 and 9 are rejected by the teaching of the backing film (Foil) being made of polyester of thickness 50-100um [Paragraph 20].

Claim 10 is rejected by the teaching of printing, brushing, or spraying being methods to apply the catalyst layer [Paragraph 19].

Claim 15 is rejected by the teaching of a water bath at temperature of 80°C being employed after the drying (last) processing step [Paragraph 29].

Claim 19 is rejected by the statement that MEAs are used for fuel cells which is a type of electrochemical device [Paragraph 6-7].

3. Claims 1, 3, 6-11, 14, and 17-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoshitake (JP 2001/160405).

Claims 1, 11, and 18 are rejected by Yoshitake teaching a direct catalyst ink solvent being applied to an ion-exchange membrane (PEM), wherein the membrane is fixed to a base material (Foil) [Paragraph 21]. A catalyst-membrane is formed on the opposite side of the base material [Paragraph 21]. The base material is exfoliated (removed) [Paragraph 21]. A Post-it cover tape is placed over the newly created membrane, and then a second catalyst-membrane layer is produced in its place [Paragraph 21]. The Post-it cover tape is lifted from the device [Paragraph 21]. Drying steps are used after the catalyst-membrane layers are formed [Paragraph 21]

Claim 4 is rejected by the teaching of a lamination process to fix the membrane to the supporting foil [Paragraph 30].

Claims 6 and 7 are rejected by the teaching of PET, polyolefine, tetrafluoroethylene/ethylene copolymer or polyimide being used as the support foil [Paragraph 17] at a thickness of 50-250um [Paragraph 14,30].

Claims 8 and 9 are rejected by the teaching of the thickness of the ion-exchange resin being 50 um [Paragraph 30] and comprising perfluorinatedsulphonic acid compositions (Paragraph 27, 30, 32).

Claim 10 is rejected by the teaching of screen printing being employed to add the catalyst layer to the product [Paragraph 20].

Claim 13 is rejected by the teaching of removing a second tape layer from a membrane [Paragraph 35]. Observation showed that the tape did not decrease wrinkles on the second tape removal [Paragraph 35].

Claim 14 is rejected by the teaching of applying an adhesive between the supporting foil and the membrane [Paragraph 10].

Claim 17 is rejected by the teaching of drying time to be 5min-3hours [Paragraph 19] at a temperature of 80°C [Paragraph 33].

Claim 19 is rejected by the teaching of the MEA applied for fuel cells [Paragraph 1, 29].

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kohler et al (PGPUB 2002/0064593) as applied to claim 1 above, and further in view of Puffer et al (PGPUB 2005/0281981).

Kohler teaches the process for forming a 3-layered catalyst-coated polymer. Kohler teaches that the support foil can be the GDL-catalyst layer [Paragraph 20], but fails to teach a perforated support foil.

Puffer teaches the methods for facilitating the fabrication of devices having thin film materials [Abstract]. He teaches that perforations can be added to the process steps at any time during the process [Paragraph 57]. It would have been obvious to one

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of ordinary skill in the art at the time of the invention to use the method of perforating the thin film material during the electrode-membrane-electrode assembly because Puffer teaches solutions for problems in handling and assembly of MEAs and electrodes [Paragraph 4].

Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kohler et al (PGPUB 2002/0064593) as applied to claim 11 above, and further in view of Asano et al. (PGPUB 2002/0172850).

6. Kohler teaches the need for a drying step and gives a preferred temperature of 80°C [Paragraph 29]. The prior art is silent as to a specific time or method of drying.

Asano teaches a method for making a PEM. During the fabrication of the MEA, a drying step at 60°C for 10 min was taught after the catalyst paste was screen-printed on to the underlying gas diffusion layer [Paragraph 535]. A heating process requires hot heat [Paragraph 569]. It would have been obvious to use Asano for method of heating, drying time, and drying temperature because it teaches a PEM that has excellent performance in generating electricity irrespective of changes in temperature and humidity.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to STEPHEN YANCHUK whose telephone number is



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(571)270-7343. The examiner can normally be reached on Monday through Thursday 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Sample can be reached on 571-272-1376. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David R. Sample/  
Supervisory Patent Examiner  
Art Unit 4131

/STEPHEN YANCHUK/  
Examiner, Art Unit 4131